

W-S-896E  
July 25, 1974  
SUPERSEDING  
Int Fed Spec W-S-00896d(GSA-FSS)  
July 17, 1967, and  
Fed Spec W-S-896c  
April 10, 1964

## FEDERAL SPECIFICATION

### SWITCHES, TOGGLE (TOGGLE AND LOCK), FLUSH MOUNTED

#### (GENERAL SPECIFICATION)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies

#### 1 SCOPE

1.1 This specification covers the general requirements for flush mounted toggle and lock switches, designed for mounting in switch boxes by means of an integral strap (see 6 1)

#### 2 APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

##### Federal Specification Sheets

- W-S-896/1 - Switches, Toggle and Lock, Flush Mounted (AC-DC "T" Rated).
- W-S-896/2 - Switches, Toggle and Lock, Flush Mounted (AC).
- W-S-896/3 - Switches, Toggle, Flush Mounted (Mercury) (AC).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U S. Government Printing Office, Washington, DC 20402

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies )

##### Military Specifications

- MIL-S-28786 - Switches, Preparation for Delivery of
- MIL-C-45662 - Calibration System Requirements.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer )

FSC 5930

**2.2 Other publications** The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

National Bureau of Standards Handbook

H28 - Screw-Thread Standards for Federal Services

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

Underwriters' Laboratories, Inc. (UL) Standard

UL 20 - Standard for Snap Switches

(Application for copies should be addressed to Underwriters' Laboratories, Inc., Walt Whitman Road, NY 11746, 207 E. Ohio Street, Chicago, IL 60611; and 1655 Scott Blvd., Santa Clara, CA 95050. Technical societies and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

### 3 REQUIREMENTS

**3.1** Except as otherwise specified herein, switches furnished under this specification shall conform to the applicable requirements of UL 20.

**3.2 Specification sheets.** The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between this specification and the specification sheet, the latter shall govern (see 6.2).

**3.3 Qualification.** Switches furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.5 and 6.3).

**3.4 Materials.** The materials shall be as specified in UL 20. However, when a definite material is not specified, a material shall be used which will enable the switches to meet the performance requirements of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

**3.5 Design and construction.** Switches shall be of the design, construction, and physical dimensions specified (see 3.2).

**3.5.1 Actuating member.** The actuating member shall be in accordance with the following, and as specified (see 3.2).

<u>Actuating member</u>	<u>Design code</u> <u>(see 3.7.1)</u>
Handle (brown) - - - - -	A
Handle (ivory) - - - - -	B
Locking (key operated) with brown key guide - - - - -	C
Locking (key operated) with ivory key guide - - - - -	D
Locking (key operated) with simulated stainless steel key guide - - - - -	E
Handle (illuminated) - - - - -	F

**3.5.2 Mounting.** Switches shall be provided with an integral mounting strap. The mounting strap shall be provided with extension ears, which shall be scored so that they can be broken off when not needed.

**3.5.3 Terminals.** Switches shall have screw or screwless type terminals. Switches with screwless type terminals shall have spring contacts which will hold the wire in place when the wire is subjected to a pull of not less than 20 pounds. Switches having a rating of 20 amperes and up shall have terminals which will receive and properly hold each of the following AWG size wires singly, No. 14, No. 12, and No. 10. Switches having a rating of less than 20 amperes shall have terminals which will receive and properly hold each of the following AWG size wires singly; No. 14 and No. 12.

**3.5.4 Screw threads.** Screw threads shall be in accordance with Handbook H28, and shall be as specified (see 3.2)

**3.6 Endurance.** When switches are tested as specified in 4.8.2, there shall be no electrical or mechanical failure.

**3.7 Marking** Switches shall be marked in a manner which will be plainly visible after the switch has been installed (but not on removable plaster ears). Switches shall be plainly marked with W-S-896, manufacturer's name or trademark, electrical ratings, and marking to indicate when the current is "on" or "off", except for three-way, four-way, and locking (key operated) switches. Mercury switches shall be marked to indicate the required mounting position. A switch recognized as suitable for the control of tungsten-filament lamps on direct current as well as alternating current shall be identified as such by means of the letter "T". The Government part number, as specified in 3.7.1, shall be marked on each unit package.

**3.7.1 Government part number.** The Government part number shall consist of the specification sheet number, an assigned dash number, and a single-letter code to indicate the design of the actuating member (see 3.5.1), as shown in the following example (see 3.2 and 6.2)

WS896/1 - 01B

Specification sheet  
number

Dash number with  
design code "B"

**3.7.2 Underwriters' Laboratory listing mark.** Switches which have been certified by Underwriters' Laboratories shall have the listing mark on each switch and shall be plainly visible when the switch is installed.

**3.8 Workmanship.** Switches shall be processed in such a manner as to be uniform in quality and shall be free from loose terminals, cracked or displaced parts, sharp edges, burrs, chips, and other defects that will affect life, serviceability, or appearance.

#### 4. QUALITY ASSURANCE PROVISIONS

**4.1 Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

**4.1.1 Test equipment and inspection facilities.** Test equipment and inspection facilities shall be of sufficient accuracy, quality and quantity to permit performance of the required inspection. The supplier shall establish calibration of inspection equipment to the satisfaction of the Government. Compliance with the requirements of MIL-C-45662 shall be acceptable.

4.2 Classification of inspections The inspections specified herein are classified as follows

- (a) Qualification inspection (see 4.5)
- (b) Quality conformance inspection (see 4.6).

4.3 Inspection of materials and components In accordance with 4.1, the supplier is responsible for insuring that materials and components used were manufactured, tested, and inspected in accordance with the requirements of this specification and of referenced subsidiary specifications and standards to the extent specified, or if none, in accordance with this specification (see 3.4)

4.4 Inspection conditions All inspections, examinations, and tests shall be performed in accordance with the applicable conditions specified in UL 20, and as specified herein

4.5 Qualification inspection Those switches which meet the inspection in 4.5.1 shall be considered qualified for inclusion on the qualified products list. Qualification inspection shall be performed at Underwriters' Laboratories or any laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production

4.5.1 Inspection routine Switches shall be subjected to the inspection and test specified in UL 20, except the endurance test shall be in accordance with 3.6. Sample size, character of failures, and number of failures permitted shall be as specified by UL inspection procedures. Products which have been so certified by Underwriters' Laboratories shall be considered suitable for inclusion on the qualified products list.

4.5.2 Retention of qualification The supplier shall forward to the preparing activity at 12-month intervals certification signed by a responsible official of management, attesting that the listed product(s) is still available from the listed plant, can be produced under the same conditions as originally qualified, i.e., same process, materials, construction, design, manufacturer's part number or designation, and meets the requirements of the current issue of the specification. Failure to provide the certification will be cause for removal from the qualified products list. After completion of the certification review, the qualified products list shall be reprinted to show the date of validation. DD Form 1718, Certification of Qualified Products, shall be used for obtaining certification.

4.6 Quality conformance inspection Quality conformance inspection shall be in accordance with the Followup Service program of Underwriters' Laboratories, Inc.

4.7 Inspection of preparation for delivery The sampling and inspection of the preservation-packaging, packing, and marking of these switches shall be in accordance with MIL-S-28786.

4.8 Methods of examination and test Except as otherwise specified herein, the tests and examinations shall be in accordance with UL 20.

4.8.1 Visual examination Switches shall be examined to verify that the materials, design and construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see 3.2, 3.4, 3.5, 3.7, and 3.8).

4.8.2 Endurance (see 3.6)

4.8.2.1 AC-DC "T" rated switches One-half of the sample group shall be operated for 35,000 cycles at a rate of 6 to 10 operations per minute with a load of tungsten filament lamps so adjusted that the normal current flow is the rated current of the switch at 125 volts DC. The other one-half of the sample group shall be operated for 35,000 cycles at a rate of 6 to 10 operations per minute at 50 percent of rated current at 125 volts AC with a power factor of 0.7 to 0.8.

4 8 2.2 AC and mercury switches. One-half of the sample group shall be operated for 50,000 cycles at a rate of 6 to 10 operations per minute with a load of tungsten filament lamps so adjusted that the normal current flow is rated current of the switch at 120 volts AC. The other one-half of the sample group shall be operated for 50,000 cycles at a rate of 18 to 24 operations per minute at full rated current and at maximum voltage ratings, with a power factor of 0.75 to 0.80.

## 5 PREPARATION FOR DELIVERY

5 1 Preparation for delivery Switches shall be prepared for delivery in accordance with the preservation-packaging and packing requirements of MIL-S-28786

## 6 NOTES

6.1 Intended use Switches, as covered by this specification, are intended for use in any electrical circuit within voltage and current limitations and at full voltage to ground except AC-DC type switches must not be used on circuits more than 125 volts to ground and the current rating should be reduced 50 percent on inductive loads.

6 2 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Title, number, and date of the applicable specification sheet and the Government part number (see 3.2)

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Defense Electronics Supply Center, ATTN DESC-E, Dayton, OH 45444, and information pertaining to qualification of products may be obtained from that activity.

6.3.1 Application for qualification. Application for qualification tests shall be made in accordance with "Provisions Governing Qualification" which may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120

6 4 Cross-reference and supersession data The switches formerly covered in W-S-00896d(GSA-FSS) and W-S-896c are now covered by specification sheets as shown in table I. See the applicable specification sheets for detailed information.

TABLE I W-S-896 supersession data.

W-S-00896d(GSA-FSS) and W-S-896c descriptions (superseded)	Superseding specification sheet of W-S-896E
Type I (AC/DC and "T" rated at 125/250 V)	W-S-896/1
Type II (AC only, 120 V)	W-S-896/2
Type III (AC only, 120/277 V)	W-S-896/2
Type IV (AC/DC, mercury type, 125/250 V)	None (switches no longer available)
Type IV (AC only, mercury type, 120 volt)	W-S-896/3

W-S-896E

**MILITARY CUSTODIANS·**

Army - AT  
Navy - YD  
Air Force - 85

Review activities

Army - AT  
Navy - YD  
Air Force - 80  
DSA - ES

User activities·

Army - EL  
Navy - CG  
Air Force - 11

Preparing activity·

DSA - ES

Civil Agency Coordinating Activities.

GSA-FSS

(Project 5930-0888)

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Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of the general specification to obtain extra copies and other documents referenced herein. Price 25 cents each.

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1 DOCUMENT NUMBER

2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION

4 TYPE OF ORGANIZATION (Mark one)

☐

VENDOR

☐

USER

☐

MANUFACTURER

☐

OTHER (Specify) \_\_\_\_\_

b ADDRESS (Street, City, State, ZIP Code)

## 5 PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording

c. Reason/Rationale for Recommendation

## 6 REMARKS

7a NAME OF SUBMITTER (Last, First, MI) - Optional

b. WORK TELEPHONE NUMBER (Include Area Code) - Optional

c MAILING ADDRESS (Street, City, State, ZIP Code) - Optional

8 DATE OF SUBMISSION (1"YMMDD)

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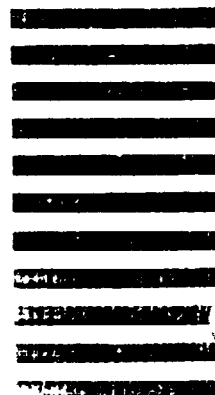
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FEDERAL SPECIFICATION

SWITCHES, TOGGLE (TOGGLE AND LOCK), FLUSH MOUNTED  
(GENERAL SPECIFICATION)

This amendment, which forms a part of W-S-896E, dated July 15, 1974, is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies

Page 1

\*Paragraph 2.1, 11st of Federal Specification Sheets

DELETE: "W-S-896/1" (with corresponding title) in its entirety.

\*Paragraph 2.1, after 11st of Federal Specification Sheets

ADD. "Federal Standards  
FED-STD-H28 - Screw-Thread Standards For Federal Services."

\*Paragraph 2.1, 11st of Military Specifications

DELETE "MIL-C-45662" (with corresponding title) in its entirety.

SUBSTITUTE: "Military Standards.  
MIL-STD-45662 - Calibration Systems Requirement."

Page 2

\*Paragraph 2.2

DELETE Entire National Bureau of Standards Handbook listing.

\*Paragraph 2.2, 11st of Underwriters' Laboratories, Inc. addresses

DELETE. "Walt Whitman Road, NY 11746".

SUBSTITUTE: "1285 Walt Whitman Road, Melville, NY 11747".

Paragraph 3.5

DELETE AND SUBSTITUTE

"3.5 Design and construction. Switches shall be of the design, construction and physical dimensions specified (see 3.2). Switches shall be of the latest model of the manufacturer's standard commercial product and shall have been in production, marketed and in use for a minimum of 1 year preceding the application for qualification. The introduction of normal product improvement changes in this 1 year period is acceptable."

Page 3

\*Paragraph 3.5.4, line 1

DELETE "Handbook H28"

SUBSTITUTE "FED-STD-H28"

W-S-896E  
AMENDMENT-2

\*Paragraph 4.1.1, last line

DELETE. "MIL-C-45662"

SUBSTITUTE. "MIL-STD-45662"

Pages 4 and 5

\*Paragraphs 4.8.2, 4.8.2.1 and 4.8.2.2

DELETE AND SUBSTITUTE:

"4.8.2 Endurance (ac and mercury switches) (see 3.6). One-half of the sample group shall be operated for 50,000 cycles at a rate of 6 to 10 operations per minute with a load of tungsten filament lamps, or a load having equivalent current characteristics, and so adjusted that the normal current flow is rated current of the switch at 120 volts ac. The other one-half of the sample group shall be operated for 50,000 cycles at a rate of 18 to 24 operations per minute at full rated current and at maximum voltage ratings, with a power factor of 0.75 to 0.80."

\*Paragraph 6.4, TABLE I

DELETE: "W-S-896/1"

SUBSTITUTE. "None (use W-S-896/2 for applications not requiring a dc current rating)".

NOTE: The margins of this amendment are marked with asterisks to indicate where changes from the previous amendment were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous amendment.

MILITARY INTERESTS.

Custodians

Army - AT  
Navy - YD  
Air Force - 85

Review activities

Army - AT  
Navy - YD  
Air Force - 85  
DLA - ES

User activities

Army - ER  
Navy - CG  
Air Force - 11

CIVIL AGENCY COORDINATING ACTIVITIES

DC Govt - DCG  
DOT - ACO  
GSA - FSS, PCD  
HHS - FEC

PREPARING ACTIVITY

DLA - ES

Project 5930-1200